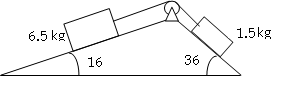
Linear Dynamics Review

1. Two blocks A and B of mass M and 3M respectively sit together on a frictionless surface. Block A is pushed with a force of 12F. Find the forces between the blocks.
2. A block of mass M sits on a frictionless ramp of angle θ. Find a simplified expression for the acceleration of the block down the ramp.
3. An Atwood machine has a mass of 2.5kg on one side and 1.5kg on the other. Find the acceleration of the machine.
4. An Atwood machine has a mass M on one side and 2M on the other. Find the acceleration of the machine.
5. A boy stands on a scale on an elevator. The scale reads 500N. The elevator then begins to move and for a while the scale reads 600N. What is the acceleration of the elevator (including direction)?
6. A girl pulls a 15kg sled down a snowy hill of incline 24o with a force of 100N. The sled accelerates at 1.1m/s2 down the hill with her. Find the coefficient of friction between the snow and sled. Is this a good day to go tobogganing? [μ=1.07, no not good conditions]
7. A string can hold up to 800N of tension before breaking. The string is attached to a 50kg mass. How fast do I have to accelerate the mass to break the string?
8. A rocket ship accelerates upwards at three times the acceleration due to gravity. What is the apparent weight of a 150lb astronaut?
9. A parachutist of mass 65kg jumps out of a plane and deploys a chute.
10. When the chute opens, she slows down from 80km/h to 10km/h in 0.8s. What is the force of the chute on her shoulders at that time?
11. After the chute deploys, she remains at 10km/h as she descends to the ground. What is the force of the chute on her shoulders during that period?
12. Find the acceleration of the system below:



1. A spider hangs from a thread attached to the rear view mirror of my car. When I drive away, the spider thread makes an angle θ from the vertical. Show that the acceleration of my car is gtanθ.